



THE UNIVERSITY *of* EDINBURGH

## Edinburgh Research Explorer

### Incisional hernia of the urinary bladder following internal hemipelvectomy

**Citation for published version:**

Arkoulis, N, Savanis, G, Simatos, G, Zerbinis, H & Nisiotis, A 2012, 'Incisional hernia of the urinary bladder following internal hemipelvectomy', *International Journal of Surgery Case Reports*, vol. 3, no. 7, pp. 316-318. <https://doi.org/10.1016/j.ijscr.2012.04.002>

**Digital Object Identifier (DOI):**

[10.1016/j.ijscr.2012.04.002](https://doi.org/10.1016/j.ijscr.2012.04.002)

**Link:**

[Link to publication record in Edinburgh Research Explorer](#)

**Document Version:**

Publisher's PDF, also known as Version of record

**Published In:**

International Journal of Surgery Case Reports

**General rights**

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

**Take down policy**

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact [openaccess@ed.ac.uk](mailto:openaccess@ed.ac.uk) providing details, and we will remove access to the work immediately and investigate your claim.





# Incisional hernia of the urinary bladder following internal hemipelvectomy

Nikolaos Arkoulis<sup>a,\*</sup>, Georgios Savanis<sup>b</sup>, Georgios Simatos<sup>b</sup>, Helen Zerbinis<sup>c</sup>, Athanasios Nisiotis<sup>b</sup>

<sup>a</sup> Department of Clinical Surgery, University of Edinburgh, 51 Little France Dr, EH16 4SA, UK

<sup>b</sup> Department of Surgery, General Oncological Hospital of Kifissia "Ag. Anargyroi", Kalyftaki 41, 14 5 64 Athens, Greece

<sup>c</sup> Department of Surgery, Royal Free Hampstead Hospital, London, UK

## ARTICLE INFO

### Article history:

Received 7 February 2012

Received in revised form 23 March 2012

Accepted 3 April 2012

Available online 9 April 2012

### Keywords:

Hemipelvectomy

Hernia

Bladder hernia

Aneurysmal bone cyst

## ABSTRACT

**INTRODUCTION:** Hemipelvectomies are uncommon operations, usually performed for primary or metastatic malignant disease and less frequently for benign-aggressive tumours. There are very few reports in literature regarding complications of these procedures and even fewer reports about post hemipelvectomy hernias in particular.

**PRESENTATION OF CASE:** We present the only reported case of an incisional hernia of the urinary bladder following internal hemipelvectomy for aneurysmal bone cyst of the pubic bone. A careful literature review is also performed.

**DISCUSSION:** The development of the incisional hernia in the case of our patient can most likely be explained by the absence of advanced malignant disease of the pelvis that not only reduces the life expectancy but also overshadows other complications post hemipelvectomy. Furthermore, her young age and level of fitness allowed for a full postoperative rehabilitation which, combined with the proven anatomical changes of the internal organs following hemipelvectomies and the weakening of the tissues around the operative site, predisposed to the hernia formation.

**CONCLUSION:** Hemipelvectomies are extensive, anatomically disruptive operations, with significant detriment to the psychosomatic well being of the patients. We presented the only reported case of incisional hernia of the urinary bladder following internal hemipelvectomy and our reconstructive method of choice. We believe that, in the case of our patient, if a mesh had been used to reconstruct the primary defect during the initial surgery, this complication could have been prevented.

© 2012 Surgical Associates Ltd. Published by Elsevier Ltd. All rights reserved.

## 1. Introduction

Hemipelvectomies are major, destructive operations, usually reserved for the resection of primary or metastatic, malignant or benign-aggressive tumours of the pelvic girdle.<sup>1,2</sup> Various types of hemipelvectomies have been described, but they can be broadly classified into external and internal.<sup>1–3,6</sup>

External hemipelvectomies invariably result in hindquarter amputations and are classified as *simple* when the pelvis is divided at the symphysis pubis and sacroiliac joint, *extended* when the surgical margins extend beyond those of the simple hemipelvectomy to include partial resection of the contralateral pelvic ring with or without adjacent organs and *modified* when the resection is more conservative and involves removal of the periacetabular region with preservation of the ilium and pubis.<sup>3</sup>

Internal hemipelvectomies involve variable resection of the innominate bone and allow for preservation of the lower extremity. They can be classified depending on the region of the resected

innominate bone from posterior to anterior as type 1-resection of *ilium* (extended type 1 has been described as en-bloc resection of the ilium and sacral ala), type 2-resection of the *periacetabular region* and type 3-resection of the *pubis*.<sup>6</sup>

While external hemipelvectomies invariably result in hindquarter amputations and are therefore associated with high functional and psychological morbidity,<sup>1</sup> internal hemipelvectomies allow preservation of the limb and have become, in certain cases, a safe alternative that has been successfully used for the treatment of benign-aggressive tumours, primary sarcomas or metastatic disease.<sup>3–6</sup>

Due to the fact that hemipelvectomies are uncommon operations performed for conditions with high mortality rates, the available literature examining their complications is scant. Postoperative hernia formations, in particular, appear to be documented very scarcely in literature and even then, they are usually associated with external, rather than internal, hemipelvectomies.<sup>2–5</sup>

We present a case of a female patient, who developed a postoperative incisional hernia of the urinary bladder following internal hemipelvectomy for an aneurysmal bone cyst. To our knowledge, this is the only reported case of bladder hernia following such a procedure. The uniqueness of this complication prompted this case report.

\* Corresponding author. Tel.: +44 131 2423614.

E-mail address: [n.arkoulis@ed.ac.uk](mailto:n.arkoulis@ed.ac.uk) (N. Arkoulis).



**Fig. 1.** A plain X-ray of the patient's pelvis, revealing the left pubic bone defect.

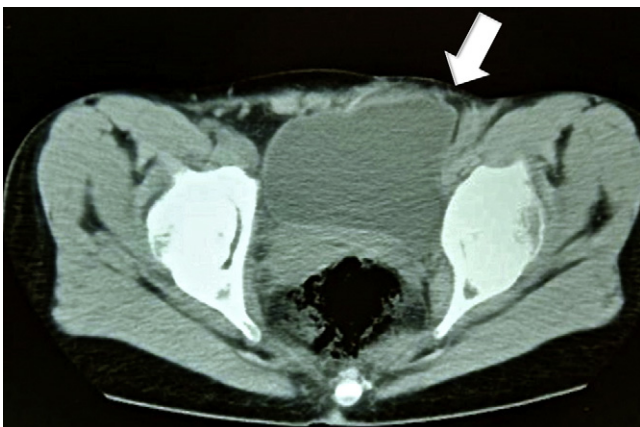
## 2. Presentation of case

Our patient was a 26-year old female, who presented to our unit with a 1-year history of a symptomatic incisional hernia of the left inguinal region. Eight years previously, she had undergone internal hemipelvectomy for a 6 cm aneurysmal bone cyst, affecting her left pubic bone and symphysis pubis. At the time, a type 3 internal hemipelvectomy was performed, during which the cyst was resected along with the superior part of the pubic bone and part of the pubic symphysis. The access incision was placed in the left inguinal region. Resection margins were proven to be histologically clear of disease.

As part of our diagnostic approach, plain X-rays and CT imaging of the pelvis were performed (Figs. 1 and 2) which revealed the presence of an incisional bladder hernia. Subsequently, the patient underwent surgery, during which the hernia was successfully reduced and the defect repaired with a polypropylene mesh, secured circumferentially on the rectus sheath, remnants of symphysis pubis, fascia lata, femoral sheath and pre-existing scar tissue (Fig. 3). Recovery and post-operative course of the patient were uneventful.

## 3. Discussion

Hemipelvectomies, both external and internal, are major procedures with many intra- and post-operative complications. Furthermore, they are uncommon operations and existing literature seems to focus more on their indications, operative



**Fig. 2.** CT imaging of the patients pelvis: herniation of the bladder through the pubic bone defect is revealed (white arrow).



**Fig. 3.** Intra-operative photograph displaying the defect following its repair with a polypropylene mesh.

variations or functional and psychological outcomes than on their complications.<sup>2</sup> Incisional hernias, in particular, have rarely been reported, which is surprising since both the change in visceral anatomy and the weakness of the tissues at the operative site would predispose to hernia formation. In particular herniation of the urinary bladder secondary to internal hemipelvectomy, such as the one we present in this paper, has never before been reported.

In a publication in 1992, Kraybill et al. presented a series of four case reports of incisional hernias following external hemipelvectomy;<sup>2</sup> two of these involved the bladder. They also examined the incidence of symptomatic incisional hernias in a series of 30 patients who underwent hemipelvectomy over a period of 50 years and reported it to be as high as 6% (2 out of 30 patients). In an editorial comment to this publication, Karakousis reiterated the development of incisional hernia as a complication from the procedure, and stated that in his series, the incidence was 20% (3 out of 15 patients). Karakousis did not mention the contents of the hernia sac in his cases. Both authors suggested that incisional hernias tended to be underreported, as they were often asymptomatic or overshadowed by the more serious complications and the poor life expectancy associated with advanced malignancies of the pelvic girdle requiring hemipelvectomy.

In a later publication,<sup>3</sup> Holbert and Lewis examined 25 patients who underwent hemipelvectomy, by utilising CT-imaging to evaluate normal and abnormal post-operative findings. Their results are very interesting as they reported post-operative anatomical changes of internal organs, including inferolateral displacement of the bladder in both male and female patients. Despite this, they did not report herniation of the bladder in any of the patients; rather, the only case of hernia they reported was a lumbar hernia in a patient that had undergone internal hemipelvectomy.

Subsequent publications reporting post-hemipelvectomy hernias are very few and far between and mostly involve incisional hernias of the stump following external hemipelvectomy.<sup>4,5</sup>

In the case of our patient, a type 3 internal hemipelvectomy with resection of the pubic bone and symphysis pubis was performed for a 6-cm aneurysmal bone cyst, which is a benign, albeit aggressive, tumour. The patient was quite young at the time of the primary surgery (17 years old) and her incisional hernia did not become symptomatic until 8 years post-operatively. The hernia sac was shown by pre-operative CT – and confirmed intra-operatively – to contain part of the urinary bladder, which is a unique case

in literature. This probably represents the fact that hemipelvectomies are uncommon procedures, usually performed in cases of malignancy, where the mortality rates are already high enough,<sup>1–3</sup> thus not allowing enough time for hernia formations. Furthermore, more serious complications tend to overshadow discomfort from incisional hernias and it is likely that if hernias do indeed occur, they remain subclinical, as the patients are often functionally limited to a great extent.<sup>1</sup> Our patient was a fit and healthy teenager, who underwent internal hemipelvectomy for benign disease and was subsequently fully mobile. The absence of malignancy, combined with the proven inferolateral displacement of the bladder following the procedure<sup>3</sup> and the weakness of the tissues around the incision, provided the necessary environment for the development of a symptomatic bladder hernia.

Although we cannot advocate a change in current techniques and approach to hemipelvectomies, we do feel that in the case of our patient, reinforcing the primary defect with a mesh during the initial operation could have prevented the hernia from developing.

#### 4. Conclusion

Existing literature attests to the fact that hemipelvectomies, both external and internal, are extensive operations, frequently followed by significant detriment to the patients' psychosomatic balance. We recently had to treat a healthy female patient who developed incisional hernia of her urinary bladder, following internal hemipelvectomy for aneurysmal bone cyst of the left pubic bone. This complication has never before been reported in literature, most likely due to the very poor prognosis and functional outcomes associated with hemipelvectomies. We believe the factors that contributed to the formation of the hernia in our patient were a combination of the benign nature of her disease, which allowed for full rehabilitation, with an anatomically disruptive operation; this created the conditions required for the development of an incisional bladder hernia. We therefore believe that, in the case of our patient, the use of a mesh to repair the defect during the primary surgery could have prevented this complication.

#### Conflict of interest statement

No conflict of interest.

#### Funding

Self-funded work.

#### Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

#### Author contributions

N. Arkoulis: literature review, writing the paper. G. Savanis: idea of paper, supervision of task. G. Simatos: supervisory and supportive role. H. Zerbinis: assistance with literature review and data collection. A. Nisiotis: assistance with editing of the paper.

#### References

1. Griesser MJ, Gillette B, Crist M, Pan X, Muscarella P, Scharschmidt T, et al. Internal and external hemipelvectomy or flail hip in patients with sarcomas: quality-of-life and functional outcomes. *American Journal of Physical Medicine & Rehabilitation* 2011;(October) [Epub ahead of print].
2. Kraybill WG, Standiford SB, Johnson FE. Posthemipelvectomy hernia. *Journal of Surgical Oncology* 1992;**51**(1):38–41.
3. Holbert JM, Lewis E. CT evaluation of the pelvis after hemipelvectomy. *American Journal of Roentgenology* 1985;**145**(6):1233–9.
4. Die Trill J, Madrid JM, Ferrero E, Igea J, Torres A, Gómez JL, et al. Posthemipelvectomy hernia. *Hernia* 2005;**9**(4):375–7.
5. Bhattacharya S, Biswas S. Post hemipelvectomy incisional hernia. *Hernia* 2009;**13**(4):435–7.
6. Bickels J, Malawer M. Pelvic resections (internal hemipelvectomies). In: Malawer MM, Sugarbaker PH, editors. *Musculoskeletal cancer surgery. Treatment of sarcomas and allied diseases*. New York: Kluwer Academic Publishers; 2004.

#### Open Access

This article is published Open Access at [sciedirect.com](http://sciedirect.com). It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.